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Title of the Invention

Mirror Arrangement for Motor Vehicles

Field of the Invention

The invention concerns a mirror arrangement for motor vehicles.

Background of the Invention

Mirrors for motor vehicles, especially outside mirrors, are continually incorporating more electronic components, which serve, for example, for the control of positioning motors, for control display devices, and for sensors and the like. DE 199 04 778 A1 discloses, for example, an outside mirror for commercial vehicles, which, during driving in a curve, automatically compensates its position, so that a dead angle in such cases is avoided. The associated electronic components for this action are enclosed within the mirror housing.

Since the outside mirror is exposed to wind and weather, it is especially vital that these electronic components be protected against dampness within the housing. Accordingly, the electronic components in question and their wiring are advantageously encapsulated in a waterproof material; i.e., they are placed in a hermetically sealed encasement. If the individual components of the mirror need to be examined for maintenance purposes, it becomes necessary to reset the electronic components and their wiring to certain operational positions or states of circuitry. For this purpose, it is necessary to access the electronic components, which, in the present example, can only be done with considerable disassembly and/or demounting operations.

Electronic control apparatuses have been offered, for instance, in anti-locking systems, which are placed in the engine compartment or motor space apart from the outside mirror. These apparatuses exhibit a diagnostic window with a magnetically sensitive circuit. If a magnet is introduced in this area, then a

reset is activated. The area of the diagnostic window in which the magnet sensitive circuit is to be found is designated with the legend "RESET".

Brief Summary of the Invention

5 The present invention provides in one aspect a mirror arrangement for motor vehicles in which specific alterations of programs and methods of operation are more easily carried out. Another aspect of the present invention provides a system and a procedure for the execution of a specified program alteration or of a method of operation. This is to be carried out by a circuit and/or a control apparatus integrally incorporated in a mirror arrangement in which the component parts are simple, reliable, and economical to manufacture, assemble and use. Other advantages of the invention will be apparent from the following description and the attached drawings, or can be learned through practice of the invention.

10 Certainly it is within the present state of the technology to reset electronic wiring or control apparatuses by a magnetically sensitive switch or the like. However, on an outside mirror for vehicles, because of design reasons, no markings corresponding to the apparatuses, for example, are provided. Such markings are not necessarily required, since maintenance personnel know the locations behind the mirror housing or the mirror pane where the magnetic sensitive switches are found.

15 With the provision of at least one magnetically activated switch to achieve a defined circuit condition or establish an operational mode in the electronic circuit and/or control apparatus in the mirror housing, the desired operational mode, or the condition of the circuit, can be achieved by a magnet of appropriate strength from outside of the mirror housing without any demounting. This considerably simplifies maintenance work, since no disassembly is necessary for the inspection of the equipment.

20 In accord with an advantageous embodiment of the invention, this activation is carried out by permanent magnets. These permanent magnets can be made simply and economically and adjusted to a specified strength.

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In accord with another advantageous embodiment of the invention, an operational-mode switch is placed directly behind the mirror pane or directly on the inside of the housing. Because of this placement, this switch can specifically be activated, since the activating magnet can be held on a corresponding 5 position on the outside of the housing or on the corresponding position on the outside of the mirror pane.

In accord with another advantageous embodiment of the invention, the at least one operational-mode switch can also be discretely activated by a 10 multiplicity of magnetic impulses, which can be generated by appropriate control of an electromagnet. Accordingly, a chance activation of the operational-mode switch is avoided.

In accord with yet another advantageous embodiment of the invention, the 15 mirror arrangement encompasses a display device, which indicates optically, acoustically, or in some other manner if the respective operational-mode switch has been activated by a magnet.

In accord with a further advantageous embodiment of the invention, the display device is an optical display device, which is specially integrated into the mirror pane. An example of such a device is disclosed by DE 199 02 487 A1. The optical display device of this disclosure is placed behind the mirror pane and 20 is only visible when it is activated. Additionally, the optical display can be employed for other purposes, which are outlined in DE 199 02 487 A1 along with the other details of this display.

In accord with a further advantageous embodiment of the invention, the 25 electronic control apparatus encompasses computer equipment and a memory storage device in which appropriate software is loaded. The magnet-sensitive operational-mode switch or test program can be activated by the software; e.g., the brilliance of an optical display built into the mirror pane can be suitably adjusted.

In accord with yet another advantageous embodiment of the invention, a 30 multiplicity of operational-mode switches is provided. The operational-mode switches are placed at different places in the interior of the mirror housing or on

the inside of the mirror pane. Activation of the various operational-mode switches serves to activate different functions of the electronic controls or to set different test programs in motion.

A system and procedure according to another aspect of the invention ensures that the magnet will be placed precisely on the correct position. Specifically, a template with position markings avoids misplacements and positioning errors, especially in the case of a multiplicity of operational-mode switches.

In another aspect of the invention, the template is configured to be placed in a defined manner on the mirror assembly without requiring additional markings on the surface of the mirror and housing. The shape of the mirror pane, together with the legend "Top" and/or "Bottom" on the template, provide an error free indication of the position of the template on the mirror arrangement.

In accord with yet another advantageous embodiment of the invention, the markings on the marked-up template are printed so that it is immediately evident which function is called up by the corresponding marking for the particular operational-mode switch. Accordingly, erroneous services are avoided.

Brief Description of the Drawings

Further details, features and advantages of the invention are evident from the following detailed description, as seen with the aid of the accompanying drawings in which there is shown in:

- Fig. 1 a schematic sectional view of a first embodiment,
- Fig. 2 a schematic sectional view of a second embodiment,
- Fig. 3 a schematic front view of a third embodiment,
- Fig. 4 a schematic front view of a marking template for the embodiment in accord with Fig. 3, and
- Fig. 5 a schematic front view of the marking template for an embodiment in which an operational-mode switch is located on an inside of a mirror housing.

Detailed Description of the Invention

Detailed reference will now be made to the drawings in which examples embodying the present invention are shown. The drawings and detailed description provide a full and detailed written description of the invention, and of the manner and process of making and using it, so as to enable one skilled in the pertinent art to make and use it, as well as the best mode of carrying out the invention. However, the examples set forth in the drawings and detailed description are provided by way of explanation only and are not meant as limitations of the invention. The present invention thus includes any modifications and variations of the following examples as come within the scope of the appended claims and their equivalents.

The detailed description uses numerical and letter designations to refer to features in the drawings. Like or similar designations in the drawings and description have been used to refer to like or similar parts of the invention.

Fig. 1 shows schematically a first embodiment of the invented mirror arrangement with a mirror housing 2 attached to a vehicle V, a mirror pane 4 placed in the mirror housing 2, and an electronic control device 6, which is placed in the interior of the mirror housing 2. The electronic control device 6 serves for the control of an optical display device 8, for the control of a gyro-device 10 for the automatic positioning of the mirror pane 4 when driving in curves and for the control of a mirror adjustment 12 for displacement of the mirror 4 in accord with positioning signals generated by switches (not shown) or for adjusting the mirror 4 via signals from the gyro-device 10.

In the interior of the mirror housing 2 at a specific position remote from the mirror pane 4, a magnetically activated operational-mode switch 14 is located. This switch 14 can be energized by an activating magnet in the form of a permanent magnet 16. This permanent magnet 16 is situated in an area on the outside of the mirror housing 2 proximate the inner side of the mirror housing 2 where the operational-mode switch 14 is positioned. The operational-mode switch 14 can be magnetically activated to energize certain circuit conditions or methods of operation in the control apparatus 6. For instance, by the activation

of the operational-mode switch 14, the electronic control apparatus 6 can illuminate the optical display device 8, or the entire displacement zone of the mirror pane 4 can be scanned. In this manner, without demounting a single component, proper functioning (or malfunctioning) of the functional elements 5 assembled in the mirror housing; e.g., the optical display device 8, the gyro-device 10, the mirror positioning apparatus 12 and even the control apparatus 6, can be examined.

Fig. 2 shows a second embodiment in which the electronic control apparatus 6 controls not only the mirror positioning apparatus 12, but also a 10 temperature sensor 18. The operational-mode switch 14 is, in this aspect, placed on the back side of the mirror pane 4 and can be activated by positioning the activation magnet 16, which is on the forward side of the mirror pane 4.

Fig. 3 shows a third embodiment of the invention in which a multiplicity of operational-mode switches 14-1, 14-2, and 14-3 (collectively, 14-i) are located on 15 the rear side of the mirror pane 4. By activation of the various operational-mode switches 14-i, various circuit effects or methods of operation may be achieved. It is possible, for instance, that with the operational-mode switch 14-1, a testing or diagnostic program for the mirror positioning apparatus 12 can be enabled, while the operational-mode switch 14-2 can be utilized to activate a test program for 20 the optical display device 8. With regard to the operational-mode switch 14-3, the circuit and/or the control apparatuses can be reset.

In order to avoid a visible marking of the position of the operation-modus 25 switch 14-i behind the mirror pane 4 on the forward side of the mirror pane 4, a marking template 20 has been made, which is shown in Fig. 4. The marking template 20 possesses the outer form of the mirror pane 4 and it outlines indicators or markings 22-i (corresponding collectively to markings 22-1, 22-2, and 22-3, for example), which furnish the individual positions of the operational-mode switch 14-i behind the mirror pane 4. Additionally, this template 20 includes a legend that signifies which circuit condition or which method of 30 operation is activated with the respective operational-mode switch 14-i at the position in question. Moreover, the legend "Bottom" 23, may be provided to

ensure that the marking template 20 has been laid on the mirror pane 4 in the correct orientation. Other legends having different placements on the template 20 and different wording are also contemplated to positively orient the marking template 20. Accordingly, in case of maintenance work, the marking template 20 is employed by the maintenance personnel to ensure that the activation magnet 16 is positioned at the correct location.

Fig. 5 shows a variant of a marking template 26, which is appropriate for such an embodiment in which the operational-mode switch 14-i is placed on the inner side of the mirror housing 2, such as in the case of the embodiment shown in Fig. 1. The marking template 26 encompasses a principal part 28 with elongated members 30 extending therefrom. The legends 22-i for the operational-mode switch 14-i are written on the elongated members 30, which extend from the principal part 28. Likewise on the elongated members 30, the legends 24 are impressed to provide information as to which function the respective operational-mode switch 14-i has. The principal part 28 is preferably rigid and is made, for instance, of cardboard and adapted to the shape of the mirror pane 4. The elongated members 30, on the other hand, are flexible and allow themselves to be folded up.

By way of example operation, upon laying the principal part 28 in the proper orientation in accord with the label "Bottom" 23, and wrapping the flexible, extended members 30 around the housing 2, the elongated members 30 are laid in close contact on the outside of housing 2. The markings 22-i then provide the exact location of the operational-mode switch 14-i on the inside of the mirror housing 2. This method provides in a clear and unambiguous way the position and the function of the individual operational-mode switch 14-i to maintenance personnel.

Alternatively, it is possible to install operational-mode switches 14-i on both the rear side of the mirror pane 4 as well as in the interior of the mirror housing 2. In this case, where the marking template 26 is concerned, legends 24 and markings 22-i are placed on the principal part 28.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope and spirit of the invention. For example, specific shapes of various elements of the illustrated embodiments may be altered to suit particular vehicles or other environments and applications. It is intended that the present invention include such modifications and variations as come within the scope of the appended claims and their equivalents.

Claims are pending.